PART 6

Performance Factors

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Chapter 14

Posture And Body Mechanics

"Good posture has many values for the soldier. First, a soldier is often judged by his appearance – the man with good posture looks like a good soldier, he commands attention. Secondly, It is an accepted psychological fact that good posture is associated with good morale – a man with good posture feels better and is more positive. A man with poor posture cannot feel as positive, consequently he may develop a negative and discouraged attitude. Thirdly, good posture permits the body to function most efficiently."

FM 21-20, Physical Training (January 1946)

Posture and body mechanics are critical factors for soldier performance, allowing them to move efficiently, with an ability to create great force and absorb heavy resistance. Posture is any position in which the body resides. It is further defined by the relationship of body segments to one another. Body mechanics is posture in motion. Though posture is often thought of as a stationary position, control of moving postures is perhaps even more important in task performance and injury control.

SECTION 1- POSTURE

EFFECT OF POSTURE

When body segments are aligned properly, movement is efficient and injury risk is minimized. When body segments are not aligned properly, movement is less efficient and risk of injury is increased. Consider a soldier attempting to lift a heavy load from the ground with their legs straight and trunk twisted. Not only will the load seem heavier than if his knees were bent and back straight, but he is at risk for injury. The back injury that occurs during an improper lift is an obvious example of the relationship between posture, body mechanics, performance and health. Less obvious, but just as damaging, is the daily stress that takes its toll on the body when faulty postures are consistantly assumed.

EFFECT OF GRAVITY

Gravity molds body tissues. The body adapts to the stresses placed upon it. Gravity exerts a constant influence. When body segments are not aligned properly, such as when the head is too far forward, gravity works to further pull the head forward, placing undue stress on the structures of the neck and upper back. Over time, the neck adapts to faulty posture and natural neck movements may become restricted. Another example of this effect is seen among those who allow their shoulders to round forward. Gravity compounds this effect, limiting overhead range-of-motion as shown in Figure 14-1. By simply pulling the shoulders back as in Figure 14-2, the arms are then free to move fully overhead. To maintain this optimal position, soldiers will need to regularly stretch the chest muscles that are prone to tightness and strengthen the upper back muscles that promote proper carriage of the shoulder girdle. More importantly, they need greater awareness of the manner in which they carry the shoulder girdle while performing everyday tasks. Rounding of the shoulders is a common postural problem among soldiers, perhaps from emphasizing pushing exercises at the expense of pulling motions.

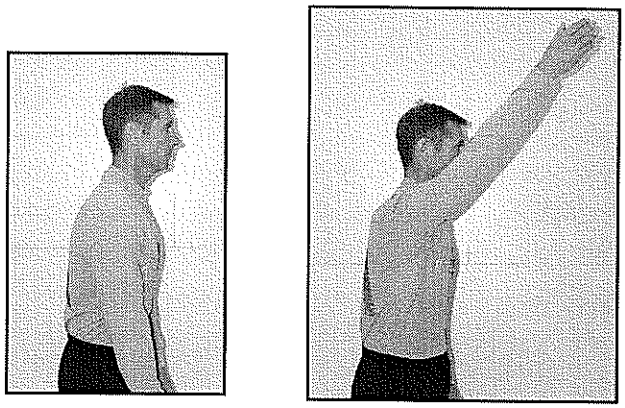
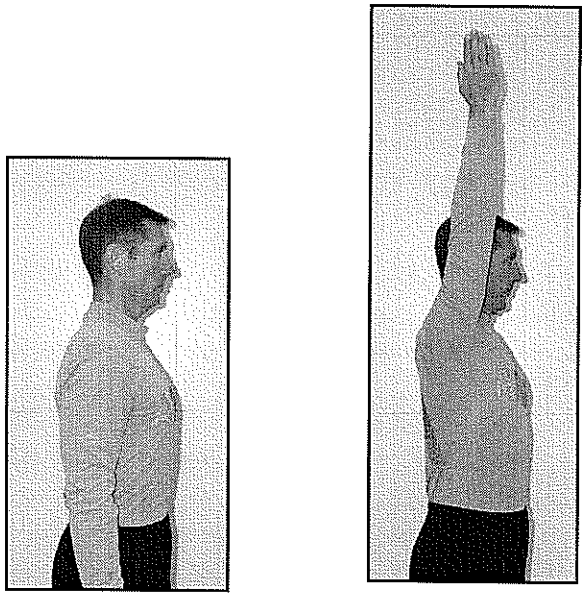


Figure 14-1.

Figure 14-2.



EFFECT OF EXERCISE

Like gravity, exercise also molds body tissues. As previously noted, imbalanced exercise practices may adversely affect posture. The exercise drills and activities listed in this manual, when regularly performed with precision, will enhance posture and improve body mechanics. For example, Exercise 1 of Conditioning Drill 1, The Bend and Reach, provides an excellent stretch of the lower back and shoulders, muscle groups that is prone to tightness.

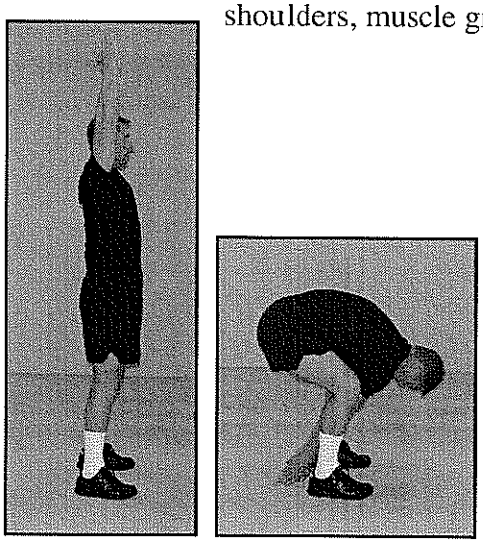


Figure 14-3.

IMPROVING POSTURE

Improving posture must be built upon the desire to move correctly and efficiently at all times. Regardless of the amount of instruction given and exercise performed, soldiers will habitually assume good postures only if they want to.

Good standing and sitting postures are characterized by vertical alignment of certain body segments. However, posture is not improved by forcefully holding the body in a position of ideal alignment. In fact, excessive effort to hold the body in a given posture will only serve to increase muscular tension and fatigue. Assuming naturally balanced postures shifts the weight of the body onto the bones, relieving muscles of the need to support weight bearing. Though the following recommendations are given in the form of a checklist, don't force your body to immediately conform to these ideals. Habits that have been reinforced over decades will take time to correct. Regular and precise performance of the PRT activities in this manual will enhance posture and body mechanics.

Checkpoints for Sitting:

- Center the head between the shoulders and keep the chin level.
- Draw the shoulders comfortably back; don't allow them to round forward.
- Carry the chest comfortably up and out.
- Maintain the inward curve of the lower back; don't allow it to roll outward or inward excessively. Use a firm support between the lower spine and the backrest of the seat or chair to assist in maintaining the proper position.
- Maintain 90-degree angles at the hips and knees with the feet flat on the floor.

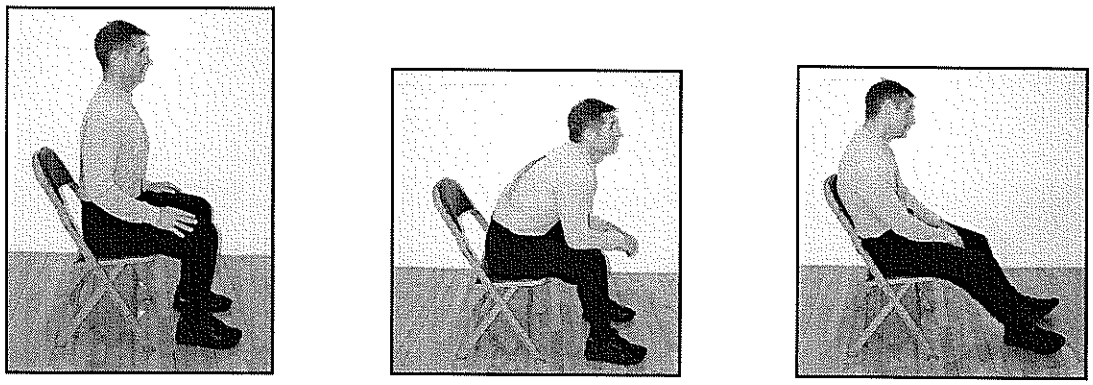


Figure 14-4.

Checkpoints for Standing:

- Stand as tall as possible. The head should not be tilted or the shoulders raised.
- Center the head between the shoulders and keep the eyes and chin level.
- Slightly draw the chin inward by pressing the neck back toward the collar. Moderately elevate the chest without strain. If the chest is raised properly, the abdomen flattens normally. Don't draw in the stomach to the extent that normal breathing is restricted.
- Relax the shoulders and let them fall evenly. If the shoulders round forward, draw them back slightly, without strain.
- Set the pelvis and hips level.
- Keep the knees straight but not locked.
- Direct the feet forward without strain. Variations in skeletal alignment will prevent some individuals from assuming the feet-forward position.
- Distribute the weight evenly between the heels and balls of the your feet.

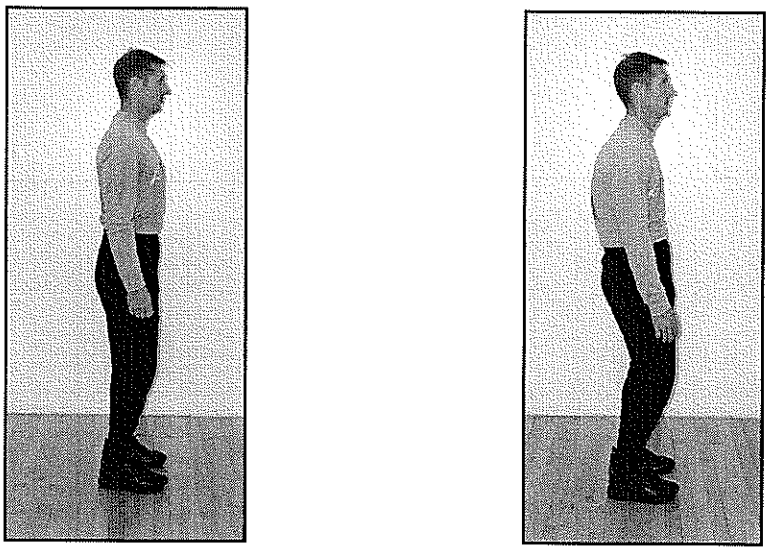


Figure 14-5.

Compensating for the Effects of Common Postures

Given the broad definition of posture (any position in which the body resides), the number of postures soldiers may assume is infinite. However, soldiers assume the same few postures throughout most of the duty day. The postures can be categorized as: 1) the flexed posture, associated with sitting, bending forward, lifting, and crouching; and 2) the upright posture, associated with standing, walking, marching, and running. The body will eventually conform to accommodate these postures. Some muscles will become over-stretched and weak, while others will tighten and lose flexibility. The resulting muscle imbalances will hinder natural movement and increase the likelihood of injury. It is important to regularly compensate for time spent in these prolonged postures by performing exercises or activities that restore the optimal flexibility of muscles and joints:

Performing extension compensates for flexion. The most common posture for many individuals is seated. This posture is associated with flexion of the spine. Unless great effort is made to sit straight (or a roll is used to maintain the inward curve of the low back), the trunk tends to assume a C-shape. The longer this flexed posture is assumed, the greater will be the effect on muscles around the trunk. The back muscles and ligaments become over-stretched and weak, while muscles on the other side of the trunk (for example, hip flexors) get tighter and pull the pelvis into an unbalanced position. In Figure 14-6 below, the soldier on the right is in a flexed position. Compensation for prolonged time in this position would occur if the soldier assumed the prone position of extension demonstrated by the soldier on the left. To prevent the imbalances associated with too much flexion, soldiers should regularly perform extension exercises and activities such as those in Figure 14-7.

Figure 14-6.

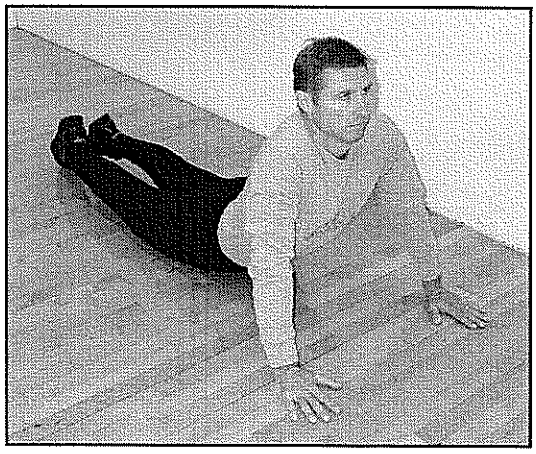


Figure 14-7.

Performing decompression compensates for compression. Many soldiers spend the majority of their day on their feet. The weight of the body and equipment creates a compressive effect on the spine and other weight-bearing joints. In fact, at the end of the day enough fluid will have been compressed out of the spinal discs that height measurements will usually indicate that soldiers are noticeably shorter. Joints that are overly compressed may eventually compromise mobility. In order to compensate for compressive forces on the spine, it is useful to perform exercises or activities that decompress as shown in Figure 14-8.

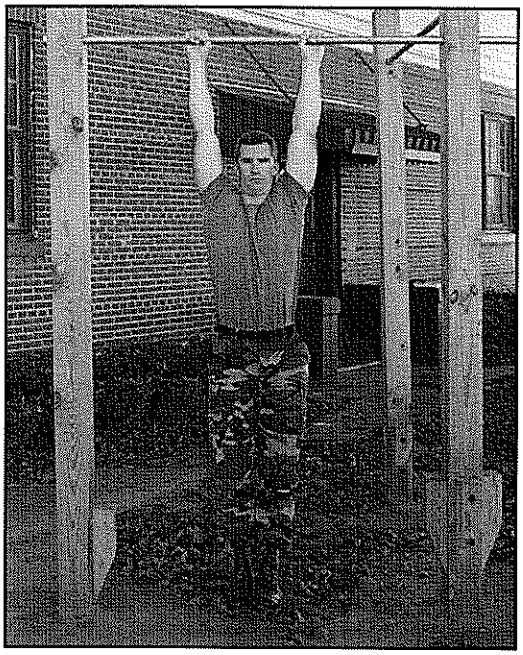


Figure 14-8.

Body Mechanics

Body mechanics (posture in motion) is the ability to control body movement. Many discussions of posture are limited to static positions, such as sitting and standing. Good posture during movement is imperative to efficiency and injury control. Just as good posture requires balanced alignment of the body, so does exercise. Many soldiers use awkward movements as they struggle to perform one last repetition. **When body mechanics are poor, the exercise serves little purpose and may do more harm than good.** The activities in the PRT system were designed to reinforce proper body mechanics. Of special importance to PRT leaders are the checkpoints given for each exercise. Adherence to these checkpoints ensures optimal execution of the exercise. Over time, skillful movements become second nature to the soldier. When this occurs, physical readiness is enhanced and injury risk is minimized.

Preparing the Body's Core

Muscles work to initiate and control movement. Because movement is more apparent than the lack of it, the focus is most often on the movement that muscles create. Less obvious though is the "braking" force that muscles apply to movement. Without this braking force, nearly all movement would be extremely sloppy and potentially dangerous. Around the body's core (trunk and pelvis), this braking action of the muscles becomes extremely important for two reasons. First, the spine and pelvis are the base of attachment for many muscles that power the arms and legs. Without a strong, stable base of support, using these muscles is like firing a cannon from a canoe. Secondly, the body's center of gravity is within the core area. Keeping it there leads to balanced, skillful movement. This is the job of the core muscles and they do it primarily by putting on the brakes. The ability to maintain balanced postures is often referred to as stabilization. The load on the soldiers shown in Figure 9-9 demands strength and stability from the body's core.

Figure 14-9.

To promote stable postures during exercise, it is essential that soldiers learn to prepare the core. A simple, two-part action prepares the core for exercise:

- **Set the hips**. This is also referred to as the neutral position of the pelvis. This position is found by first tilting the pelvis forward (buttocks goes back, belly goes forward, and the inward curve of the low back is increased), Figure 14-10a. Second, tilt the pelvis backward (the buttocks and belly draw inward as far as possible, flattening the curve of the low back), Figure 14-10b. Then settle in between these two extremes, Figure 14-10c.
- **Tighten the abdominal muscles**. Once the hips are set, tightening the abdominal muscles will ensure readiness of the muscles that control and protect the trunk. To contract the correct muscles, imagine drawing the gut straight inward as if preparing for a blow to the mid-section or trying to appear slimmer than you really are. Keep the hips set as the abdominals are tightened, Figure 14-10c.

After setting the hips and tightening the abdominal muscles, the soldier's posture should appear balanced and ready for exercise. The soldier should not associate these two actions with a stiff, awkward posture. The goal is not to eliminate all movement from the core, but to simply control the natural motion that will occur.

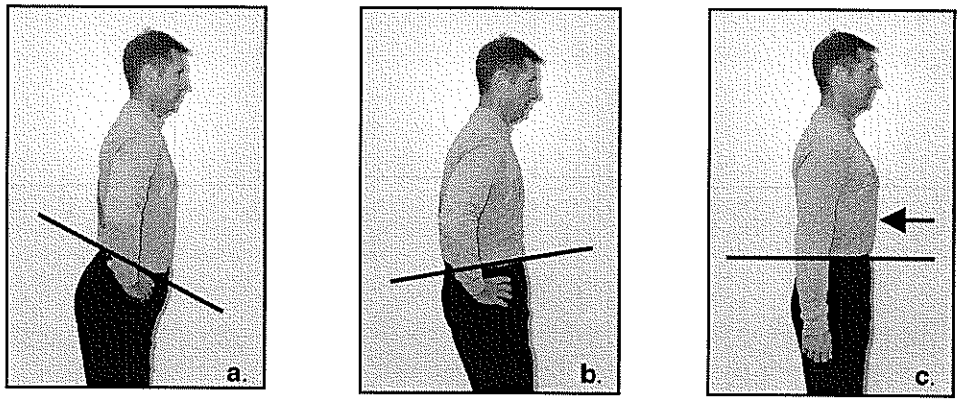


Figure 14-10.

POWER POSITION

Proper body mechanics are essential for the powerful movements required of soldiers. From the power position, the soldier is ready to:

- respond to or deliver aggression
- squat to lower or lift a heavy load
- accept a heavy load being passed from another individual
- sprint to cover

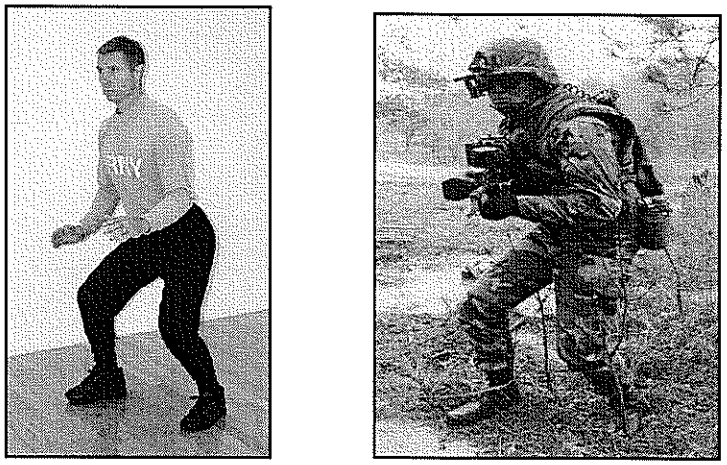


Figure 14-11.

To assume the power position, first, set the hips and tighten the abdominals as described above. From the straddle stance, placing one leg six to eight inches behind the other, and crouch so that the hips go rearward and the trunk counterbalances by leaning slightly forward. The balls of the feet accept most of the body weight. The shoulder blades are pulled slightly back, but not forced. The chest is high, head is level, and elbows and knees are comfortably bent (about 45-degrees).

LIFTING FROM THE GROUND

- Power the lift with the legs, not the back. Then continue to bend at the hips and knees to lower the body. In order to protect the back, keep the hips set and the abdominal muscles tight throughout the lift. Keep the load close to the body from start to finish. When soldiers must turn under load, do so by pivoting the feet rather than twisting the trunk.

Figure 14-12.

Lifting Overhead

Most of the power for pushing an object overhead comes from the legs. To transmit leg strength through the trunk and arms to the object being pushed, set the hips and tighten the abdominal muscles. Hands should be placed shoulder width apart with the upper arms in line with the trunk. Squat slightly then forcefully straighten the legs in a coordinated effort with the action of the arms.

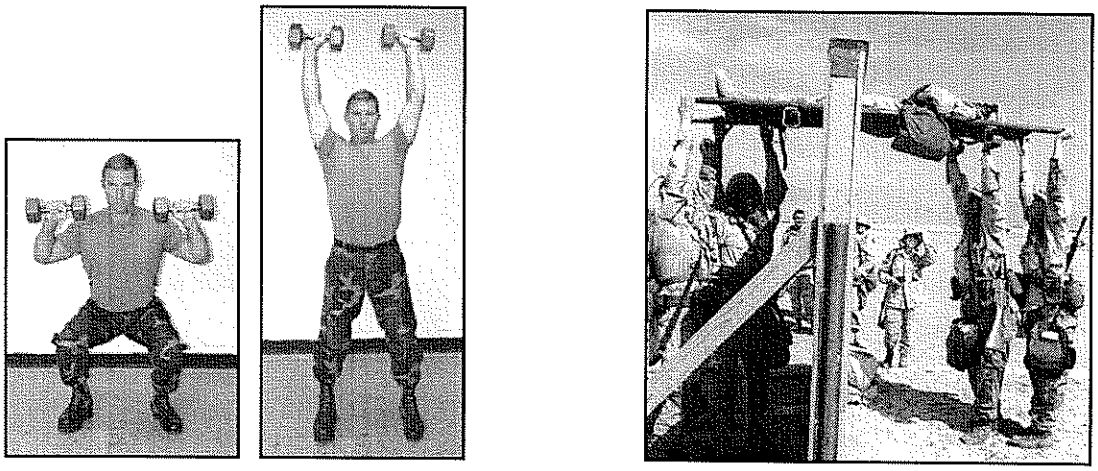


Figure 14-13.

Pushing

Push with the hands in front of the shoulders and the upper arms close to the body. This technique creates a mechanical advantage that is lost the farther the hands and arms are from this position. Because this method is the most functional, the calisthenic drills use this technique.

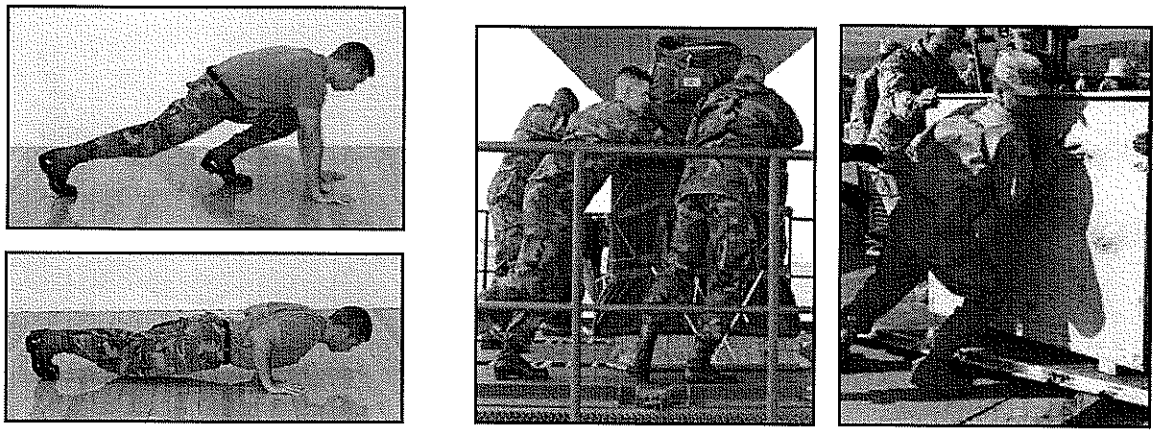


Figure 14-14

Pulling/Climbing

When pulling an object that is on the ground or horizontal to it, soldiers must assume the power position first. Set the shoulder girdle by pulling the shoulder blades slightly to the rear. This is also important when pulling the body upward from an overhead grasp. Climbing will often require the legs to power the accent or gain leverage on support structures. This will often demand significant strength from the core muscles. The exercises in the climbing drill prepare soldiers for these demands.

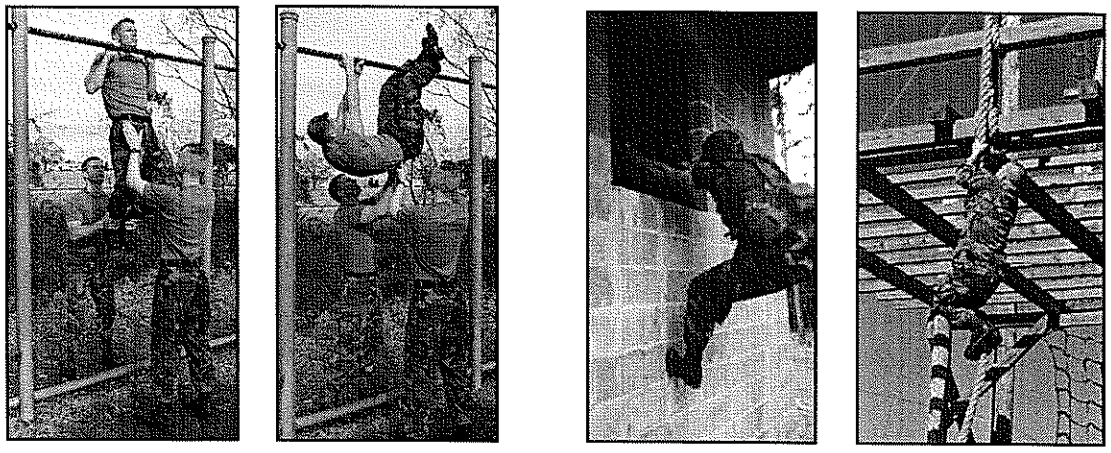


Figure 14-15.

Rotation

Prepare the body's core to control rotation. Coiling (rotating) the body then quickly uncoiling is the primary source of power for many soldier and athletic tasks such as throwing a punch, heaving an object onto a platform, or kicking a ball. Each of these activities produces a torque on the spine and other joints that may cause injury if the forces are uncontrolled. Control comes from setting the hips, tightening the abdominals, and allowing the hips and knees to bend so as to absorb some of the stress of rotation.

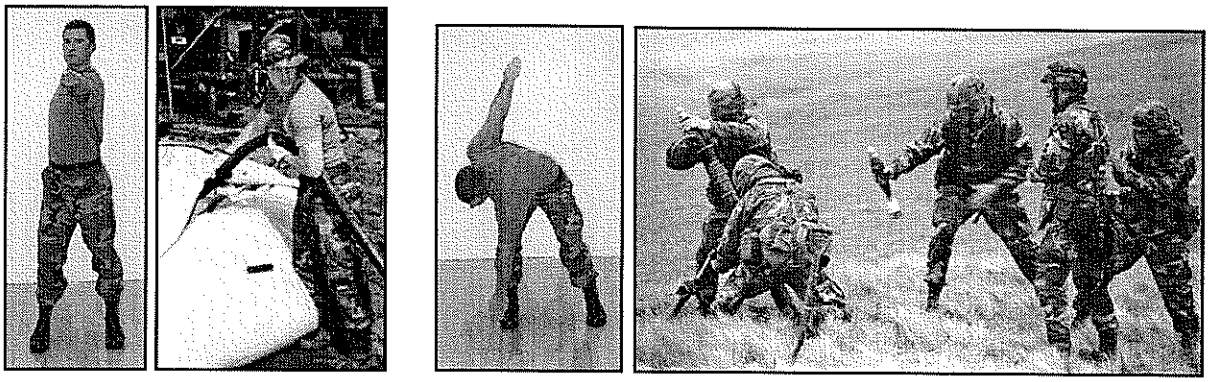


Figure 14-16.

Jumping and Landing

Land softly with alignment of the shoulders, knees, and balls of the feet. Land first on the balls of the feet with the heels touching down last. Bending of the hips and knees allows the legs to serve as coils that absorb the impact of the landing. The trunk should be straight but leaning forward so that, when viewed from the side, the shoulders knees and balls of the feet are aligned.

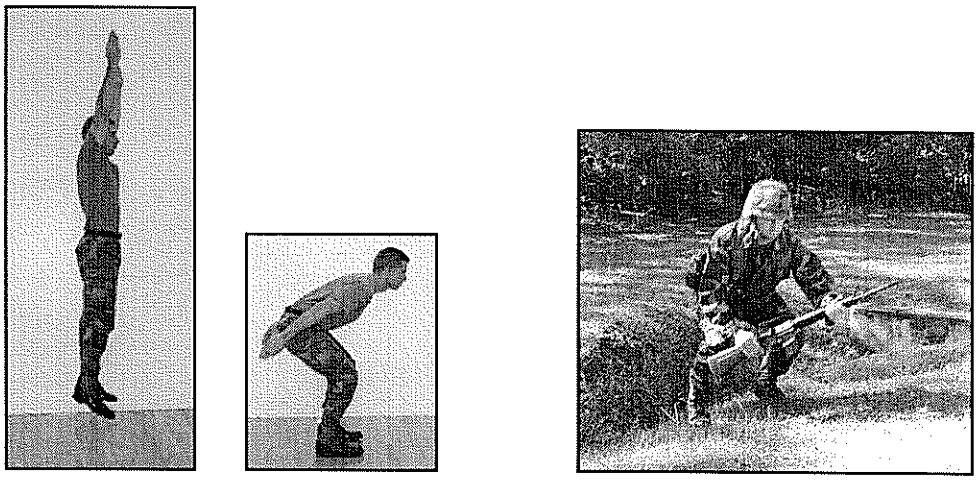


Figure 14-17.

Lunging

Maintain the knee of the forward leg in vertical alignment with the ball of the foot. Do not allow the knee to go beyond the toes nor to the right or left of the foot. Lunging is a component of many soldier tasks. The picture below, demonstrates soldiers performing a proper lunge as they begin a sprint for cover. Calisthenic and dumbbell exercises that involve lunging prepare soldiers for functional tasks such as this.

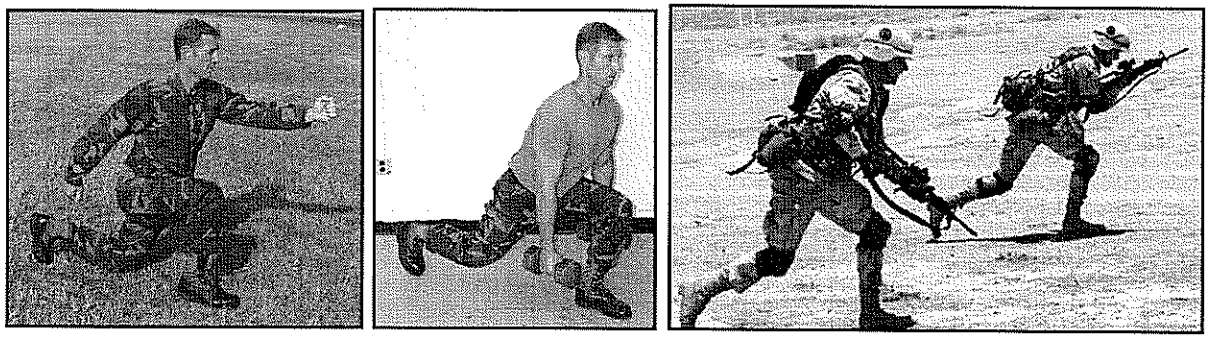


Figure 14-18.

Marching

The head and trunk checkpoints for standing also apply to marching. Allow the arms to swing naturally, though crossing the midline of the body is excessive. Allow the hips to naturally rotate forward with each stride. Do not allow the knees to lock at any point in the walking cycle. Stride naturally, landing on the heel and pushing off with most of the weight toward the big toe. The feet remain directed forward. Do not strain to keep the feet directed forward, since variations in skeletal alignment will prevent some individuals from assuming the feet-forward position. Foot marching with a load on the back will require some forward lean of the trunk. Do not, however, allow the trunk and shoulders to round forward.

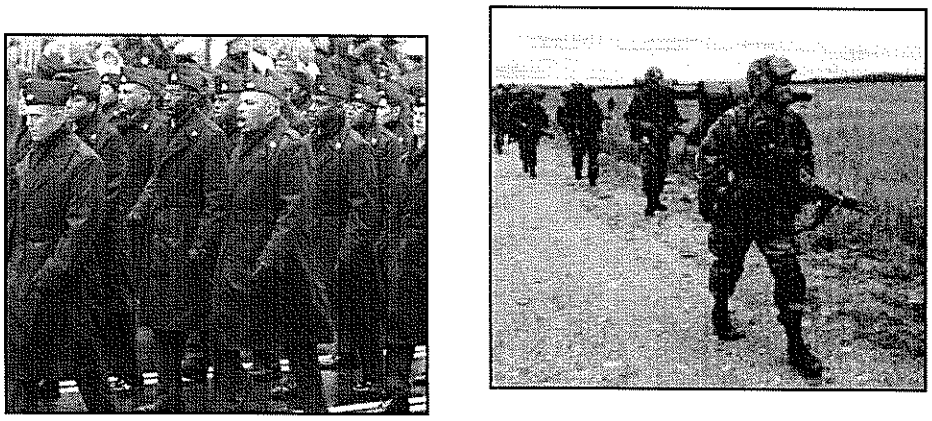


FIGURE 14-19.

Running

Changing Direction

Soldiers may be required to quickly change direction while maintaining forward movement or to reverse direction. To maintain forward movement, plant on the outside leg with plenty of bend in the hips and knees. The foot should turn slightly inward toward the change of direction. To reverse direction, as in the shuttle run, reduce forward speed and crouch so that the body is directed approximately 90 degrees from the forward direction. At the lowest point of the crouch, body weight should rest primarily on the leg closest to the new Direction od travel, shifting momentum in that direction.

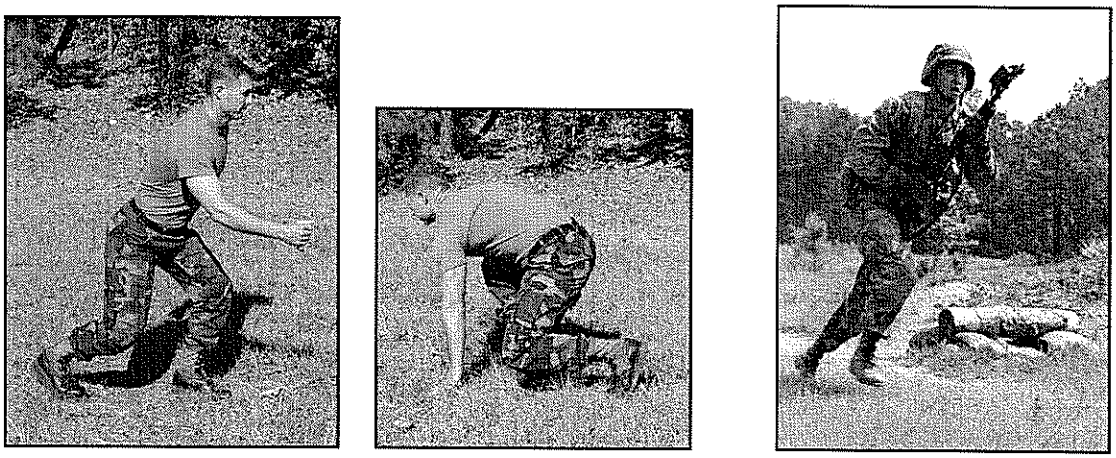


Figure 14-20.

Summary

Posture matters. Soldiers are often judged by their appearance. A balanced, alert posture portrays readiness, while sloppy posture does just the opposite. PRT leaders must understand the fundamental principles of posture and body mechanics. They must demonstrate proper carriage of the body and demand the same from their soldiers, not only during PRT, but also throughout the day. When soldiers live in good postures, the results are better performance, fewer injuries, and a confidence borne of grace, balance and power.

> *"In the training of anyone, nothing equals the importance of proper posture; it is the very foundation upon which the entire fabric of a successful course in physical training must be founded."*
>
> LTC Herman J. Koehler

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CHAPTER 15

NUTRITION AND BODY COMPOSITION

Your weight and/or body fat was or will be measured during your routine medical exam or last weigh in. Take a look at the weight allowed for your height as shown in Table 1. If you exceed the weight listed for your height, you may not necessary be over fat. Some well-muscled individuals have body weights that far exceed the values for weight listed on the charts for their age, gender, and height. Yet, only a small percentage of their total body mass may be fat. If you don't fall into the well-muscled category, it's time to starting making some changes to your lifestyle.

This exercise program meets the requirement to be physically active everyday. However, you will still need to make some small changes to your diet to so that you can report to basic training at an appropriate body composition. Losing one to two pounds a week is a realistic goal, which is best accomplished by a combination of eating less and exercising more.

Height (inches)	Female Maximum Weight (pounds)				Male Maximum Weight (pounds)			
	Age				Age			
	17-20	21-27	28-39	40 +	17-20	21-27	28-39	40 +
58	109	112	115	119	N/A	N/A	N/A	N/A
59	112	116	119	123	N/A	N/A	N/A	N/A
60	116	120	123	127	132	136	139	141
61	120	124	127	131	136	140	144	146
62	125	129	132	137	141	144	148	150
63	129	133	137	141	145	149	153	155
64	133	137	141	145	150	154	158	160
65	137	141	145	149	155	159	163	165
66	141	146	150	154	160	163	168	170
67	145	149	154	159	165	169	174	176
68	150	154	159	164	170	174	179	181
69	154	158	163	168	175	179	184	186
70	159	163	168	173	180	185	189	192
71	163	167	172	177	185	189	194	197
72	167	172	177	183	190	195	200	203
73	172	177	182	188	195	200	205	208
74	178	183	189	194	201	206	211	214
75	183	188	194	200	206	212	217	220
76	189	194	200	206	212	217	223	226
77	193	199	205	211	218	223	229	232
78	198	204	210	216	223	229	235	238
79	203	209	215	222	229	235	241	244
80	208	214	220	227	234	240	247	250
Max Allowable Body Fat	30%	32%	34%	36%	20%	22%	24%	26%

Table 1. Screening table weight. Reproduced from AR 600-9, table 1.

People always want to know if a particular food is good or bad for them. No single food choice is necessarily a bad choice. Too many bad choices over time can accumulate into a poor diet. Poor choices like a lunch of soda, chips, and a greasy hamburger once in a while will be balanced out by a better choice like a turkey sandwich with low-fat dressing on whole wheat bread and fruit on a regular basis. Eating for performance and health doesn't mean that you have to give up your favorite foods.

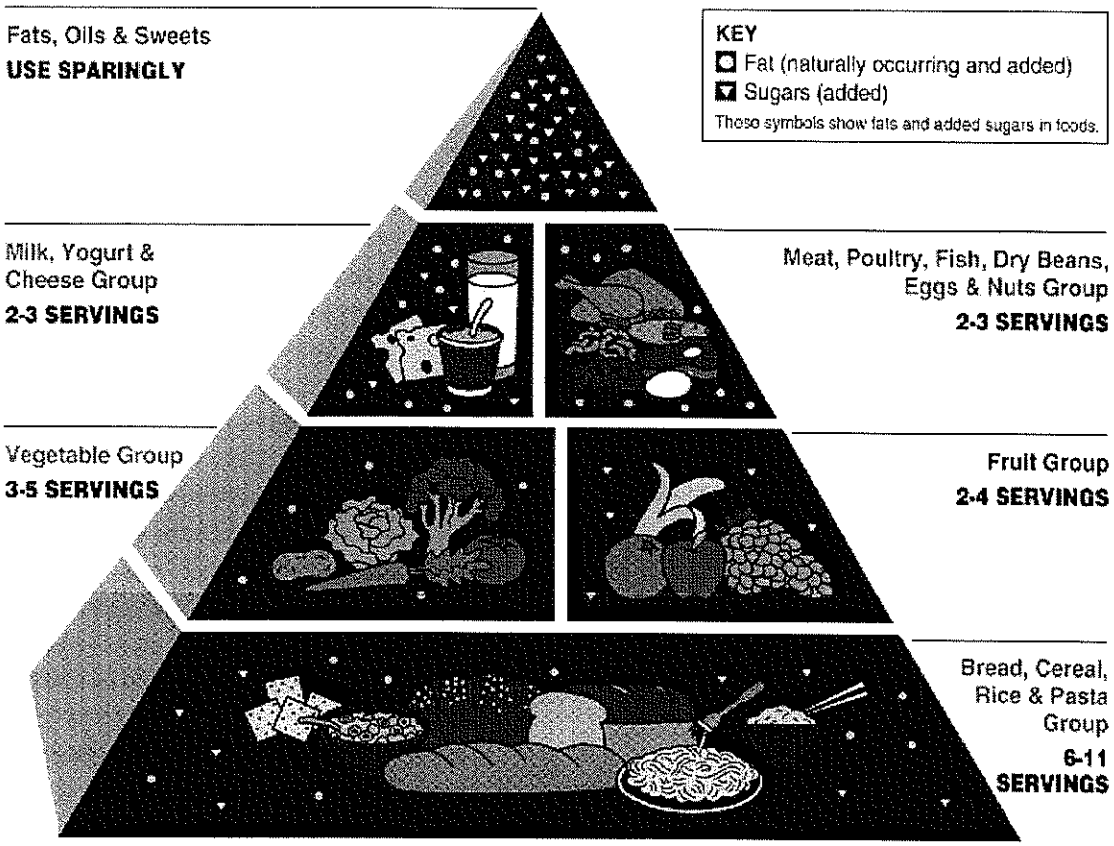

Figure 15-1.

Build a healthy base by eating a variety of foods. Different foods contain different nutrients and other healthful substances. No single food can supply all the nutrients in the amounts you need. To make sure you get all the nutrients and other substances you need for health, build a healthy base by using the Food Guide Pyramid (Figure 15-1) as a starting point. Choose the recommended number of daily servings from each of the five major food groups.

Breads, Cereals, Rice, and Pasta Group: Foods made from grains (wheat, rice, and oats) should form the foundation of a nutritious diet. They provide vitamins, minerals, carbohydrates (starch and dietary fiber), and other substances that are important for good health. Grain products are low in fat, unless fat is added in processing, in preparation, or at the table. Whole grains differ from refined grains in the amount of fiber and nutrients they provide, and different whole grain foods differ in nutrient content, so choose a variety of whole and enriched grains. Eating plenty of whole grains, such as whole wheat bread or oatmeal may help protect you against many chronic diseases. You should consume at least 6-11 servings daily from the base of the pyramid.

Consuming the recommended daily intake is not difficult if you understand serving sizes. A ½ cup of cooked rice, cereal, or pasta is about the same size as your fist. The best choices from this food group are bran cereals, oat bran, low fat bagels (pumpernickel, rye, whole wheat), whole grain muffins (bran, corn and oat bran), whole grain breads and rice, and stoned wheat and whole grain crackers.

Vegetable Group: The vegetable group is one area where many people regularly fail to consume enough. Vegetables are nature's vitamins. To ensure that you get essential vitamins and minerals, you should strive for 3-5 servings per day from this group. A serving size of raw or cooked vegetables is only ½ cup, and most people eat more. One cup of leafy raw vegetables is also a serving size, which is much smaller than the regular salad served with a restaurant dinner. A ½ cup of vegetables is about the size of a tennis ball. To maximize the vitamin and mineral content of your vegetables, don't overcook. Cook in a microwave, steamer, or wok only until tender crisp. The lighter colored vegetables, such as cucumbers, iceberg lettuce, and celery are mostly fiber and water with very little calories, vitamins, or minerals. Choose dark green, orange, and yellow vegetables. The darker the vegetable, the more likely it is to have large amounts of vitamins and minerals. A variety of different vegetables should be consumed to ensure that you receive a variety of nutrients. Broccoli, spinach, green peppers, tomatoes, cauliflower, Brussels sprouts, collards, carrots, or winter squash are the best choices. A ¾ cup of vegetable juice also constitutes a serving from this group.

Fruit Group: The fruit group, in addition to providing vitamins and minerals, also provides fiber. Two to four servings of fruits are recommended each day. Breakfast is a good opportunity to eat some fruit. Drinking a glass of fruit juice for breakfast is a convenient way to get half of the minimum daily servings. Other good choices are citrus fruits, bananas, cantaloupe, kiwi, strawberries, and dried fruit. A serving size for the fruit group is one piece of medium sized fruit or melon wedge, or a ½ cup of chopped, canned, or cooked fruit. A ½ cup of fruit is about the same size as a tennis ball. If you choose fruit juice, make sure that it is not mostly sugar and contains a good amount of vitamins and minerals. A ¾ cup of fruit juice equals one serving. Juice that you can see through (apple, grape, or cranberry juice) usually contains more processed sugar than one that you cannot see through (orange juice, peach nectar, or prune juice).

Milk, Yogurt, and Cheese Group: These dairy products are a great source of protein, vitamins, and minerals (fortified by law) especially calcium and riboflavin. The milk group, however, can also contain a large amount of fat. Many no-fat or low-fat dairy products are available, including cheese, milk, sour cream, and yogurt. Top choices are 1% or skim milk, low-fat cheese, and yogurt. The recommended number of servings per day for this group is 2-3, and is easily attainable for most soldiers. One cup of milk or yogurt, a ½ cup of natural cheese (Cheddar or Swiss), or 2 ounces of processed cheese (American) is considered a serving size. 1 ounce of cheese is about the size of four dice.

Meat, Poultry, Fish, Dry Beans, Eggs, and Nuts Group: The Meat and Beans Group is very important for obtaining protein, vitamins, and minerals. Like the milk group, this group can contain large amounts of fat as well. Quick and easy choices include canned tuna, chicken, peanut butter, lentil soup, and beans. Two to three servings from this group are required each day. Most people are at one extreme or the other by consuming too much or not enough from this group. The serving sizes typically consumed greatly exceed the nutritional requirement. For example, a typical chicken breast (8 oz) equals 2 servings (and about 50 grams of protein) while the 16-ounce steak at your favorite restaurant equals 4 servings (and about 120 grams of protein) from this group. A serving size of cooked fish, poultry, or red meat is 2 to 3 ounces (the size of a regular deck of playing cards), a ½ cup of cooked dry beans, a 2 ½ ounce soyburger, 1 egg, 2 tablespoons of peanut butter, or 1/3 cup of nuts.

Fats, Oils, and Sweets Group: At the top of the food pyramid are the items that should be eaten in moderation. However, it does not mean that you should never eat these items. Most fats and sugars are nutrient poor. Foods from this group should be chosen in moderation because they

often replace nutrient dense foods, so you may not get your daily requirement for the essential nutrients. For this reason, they are referred to as "empty" calories. This means that they provide nothing to the body except calories; no vitamins, minerals, fiber, water, or protein. Foods from this group are still an important part of a performance diet. Sweets add taste and flavor, while fat provides essential fatty acids like linoleic acid (part of every cell membrane), which can't be made by the body. A better food preparation choice is baking, roasting, or grilling, however, frying food in fat (cooking oil) once in a while is all right. Top choices from this group include olive oil, walnuts, molasses, berry jams, or a favorite dessert. There are no suggested servings for the top of the pyramid because you always have plenty of opportunity to add these to their diet without even trying.

Choose natural or less processed foods whenever possible. An apple is a better choice than applesauce, which is a better choice than apple juice, which is a better choice than apple pie. A baked potato is a better choice than mashed potatoes, which is a better choice than potato chips. Whole grain (wheat) bread is usually a better choice nutritionally than white bread. Food processing tends to remove vitamins, minerals, and fiber and add undesirable or questionable additives.

Your pattern of eating is also important. Snacks and meals eaten away from home provide a large part of daily calories for many people. Choose them wisely. Try fruits, vegetables, whole grain foods, or a cup of low-fat milk or yogurt for a snack. When eating out, choose small portions of foods. If you choose fish, poultry, or lean meat, ask that it be grilled rather than fried. Also, notice that many of the meals and snacks you eat contain items from several food groups. For example, a sandwich may provide bread from the grains group, turkey from the meat and beans group, and cheese from the milk group.

CHOOSE SENSIBLY

The carbohydrates, fats, and proteins in food supply energy, which is measured in calories. High-fat foods contain more calories than the same amount of other foods, so they can make it difficult for you to avoid excess calories. However, low fat doesn't always mean low calorie. Sometimes extra sugars are added to low-fat muffins or desserts, for example, and they may be just as high in calories.

Fats supply energy and essential fatty acids, and they help absorb the fat-soluble vitamins A, D, E, and K, and carotenoids. You need some fat in the food you eat, but choose sensibly. Some kinds of fat, especially saturated fats, increase the risk for coronary heart disease by raising the blood cholesterol. In contrast, unsaturated fats (found mainly in vegetable oils) do not increase blood cholesterol. Fat intake in the United States as a proportion of total calories is lower than it was many years ago, but most people still eat too much saturated fat. Eating lots of fat of any type can provide excess calories. The Nutrition Facts Label will state the number of grams of fat and sugar as well as protein, fiber, and sodium.

Saturated Fats: Foods high in saturated fats tend to raise blood cholesterol. These foods include high-fat dairy products (like cheese, whole milk, cream, butter, and regular ice cream), fatty fresh and processed meats, the skin and fat of poultry, lard, palm oil, and coconut oil. Keep your intake of these foods low.

Dietary Cholesterol: Foods that are high in cholesterol also tend to raise blood cholesterol. These foods include liver and other organ meats, egg yolks, and dairy fats.

Trans Fatty Acids: Foods high in trans fatty acids tend to raise blood cholesterol. These foods include those high in partially hydrogenated vegetable oils, such as many hard margarines and shortenings. Foods with a high amount of these ingredients include some commercially fried foods and some bakery goods.

Unsaturated Fats: Unsaturated fats (oils) do not raise blood cholesterol. Unsaturated fats occur in vegetable oils, most nuts, olives, avocados, and fatty fish like salmon. Unsaturated oils include both monounsaturated fats and polyunsaturated fats. Olive, canola, sunflower, and peanut oils are some of the oils high in monounsaturated fats. Vegetable oils such as soybean oil, corn oil, and cottonseed oil and many kinds of nuts are good sources of polyunsaturated fats. Some fish, such as salmon, tuna, and mackerel, contain omega-3 fatty acids that are being studied to determine if they offer protection against heart disease. Use moderate amounts of food high in unsaturated fats, taking care to avoid excess calories.

Following the tips listed below will help you keep your intake of saturated fat at less than 10 percent of your total calories:

Fats and Oils

- Choose vegetable oils rather than solid fats (meat and dairy fats, shortening).
- If you need fewer calories, decrease the amount of fat you use in cooking and at the table.

Meat, Poultry, Fish, Shellfish, Eggs, Beans, and Nuts

- Choose 2 to 3 servings of fish, shellfish, lean poultry, other lean meats, beans, or nuts daily. Trim fat from meat and take skin off poultry. Choose dry beans, peas, or lentils often.
- Limit your intake of high-fat processed meats such as bacon, sausages, salami, bologna, and other cold cuts. Try the lower fat varieties (check the Nutrition Facts Label).
- Limit your intake of liver and other organ meats.
- Use egg yolks and whole eggs in moderation. Use egg whites and egg substitutes freely when cooking since they contain no cholesterol and little or no fat.

Dairy Products

- Choose fat-free or low-fat milk, fat-free or low-fat yogurt, and low-fat cheese most often. Try switching from whole to fat-free or low-fat milk. This decreases the saturated fat and calories but keeps all other nutrients the same.

Prepared Foods

- Check the Nutrition Facts Label to see how much saturated fat and cholesterol are in a serving of prepared food. Choose foods lower in saturated fat and cholesterol.

Foods at Restaurants or Other Eating Establishments

- Choose fish or lean meats as suggested above. Limit ground meat and fatty processed meats, marbled steaks, and cheese.
- Limit your intake of foods with creamy sauces, and add little or no butter to your food.
- Choose fruits as desserts most often.

CHOOSE BEVERAGES AND FOODS THAT MODERATE YOUR INTAKE OF SUGARS.

Sugars are carbohydrates and a source of energy (calories). Dietary carbohydrates also include the complex carbohydrates starch and dietary fiber. During digestion all carbohydrates except fiber break down into sugars. Sugars and starches occur naturally in many foods that also supply other nutrients. Examples of these foods include milk, fruits, some vegetables, breads, cereals, and grains.

Added sugars

Added sugars are sugars and syrups added to foods in processing or preparation, not the naturally occurring sugars in foods like fruit or milk. The body cannot tell the difference between naturally occurring and added sugars because they are identical chemically. Foods containing added sugars provide calories, but may have few vitamins and minerals. In the United States, the number one source of added sugars is nondiet soft drinks (soda or pop). Sweets and candies, cakes and cookies, and fruit drinks and fruitades are also major sources of added sugars. Intake of a lot of foods high in added sugars, like soft drinks, is of concern. Consuming excess calories from these foods may contribute to weight gain or lower consumption of more nutritious foods. Some foods with added sugars, like chocolate milk, presweetened cereals, and sweetened canned fruits, also are high in vitamins and minerals. These foods may provide extra calories along with the nutrients and are fine if you need the extra calories.
Choose and prepare foods with less salt.

You may be able to reduce your chances of developing high blood pressure by consuming less salt. There is no way to tell who might develop high blood pressure from eating too much salt. However, consuming less salt or sodium is not harmful and can be recommended for the healthy, normal person. At present, the firmest link between salt intake and health relates to blood pressure. High salt intake also increases the amount of calcium excreted in the urine. Eating less salt may decrease the loss of calcium from bone. Loss of too much calcium from bone increases the risk of osteoporosis and bone fractures. Salt is found mainly in processed and prepared foods. Salt (sodium chloride) is the main source of sodium in foods. Only small amounts of salt occur naturally in foods. Most of the salt you eat comes from foods that have salt added during food processing or during preparation in a restaurant or at home. Some recipes include table salt or a salty broth or sauce, and some cooking styles call for adding a very salty seasoning such as soy sauce. Not all foods with added salt taste salty. Some people add salt or a salty seasoning to their food at the table. Your preference for salt may decrease if you gradually add smaller amounts of salt or salty seasonings to your food over a period of time.

IF YOU DRINK ALCOHOLIC BEVERAGES, DO SO IN MODERATION.

Alcoholic beverages supply calories but few nutrients. Alcoholic beverages are harmful when consumed in excess, and some people should not drink at all. Excess alcohol alters judgment and can lead to dependency and a great many other serious health problems. Taking more than one drink per day for women or two drinks per day for men can raise the risk for motor vehicle crashes, other injuries, high blood pressure, stroke, violence, suicide, and certain types of cancer. Even one drink per day can slightly raise the risk of breast cancer. Alcohol consumption during pregnancy increases risk of birth defects. Too much alcohol may cause social and psychological problems, cirrhosis of the liver, inflammation of the pancreas, and damage to the brain and heart. Heavy drinkers also are at risk of malnutrition because alcohol contains calories that may substitute for those in nutritious foods. If you choose to drink alcoholic beverages, you should consume them only in moderation and with meals to slow alcohol absorption.

Use of dietary supplements

Food supplementation is a multimillion-dollar business. There are thousands of supplements on the market, most of which are easily accessible to soldiers. Supplements were traditionally defined as any product made of one or more of the essential nutrients such as vitamins or protein. That definition has to been broadened to include any product intended for ingestion as a supplement to the diet. Supplements include vitamins, minerals, herbs, amino acids, botanicals, as well as concentrates, metabolites, constituents, and extracts of these substances. Supplement product labels must include the words "dietary supplement". Most products that meet this definition are not strictly regulated and are therefore not subject to any tight standards on makeup or claims. Your primary goal should be to always strive to obtain the nutrients you need from the foods in your diet. Eating a variety of foods on a regular basis is the most important step toward this goal. Supplement powders and bars can be a convenient and portable method for busy people to ensure they are consuming adequate supplies of the essential nutrients. Variety is still important because bars and powders are not always low fat, inexpensive, or easily digested by all. Supplementation should be part of a larger plan for an optimal performance diet not a replacement for poor habits and choices. Nor are supplements a substitute for regular exercise. There is no one magic pill or powder that you can take that will make you stronger, skinnier, or give you more energy. If you are considering supplements, you must weight the purported benefits against the potential risks (and cost) before deciding to use any product. Information is key. If a product makes claims that sound too good to be true, the claims probably are too good to be true.

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CHAPTER 16

SAFETY CONSIDERATIONS

Reference: FM 21-20, TRADOC Regulation 350-6

Overuse injuries can be common in IET. However, they can be controlled by carefully following the exercise principles of recovery and progression. Research suggests that there is a dose-response relationship between the amount of training and the risk of injury (i.e. the more physical activity a group performs, the more injuries will occur). Furthermore, there are thresholds of training above which fitness does not improve substantially but injury rates still increase. Physical fitness training must be progressive, disciplined training which challenges the soldier's physical ability. The progressive nature of the PT program is essential for the most beneficial development and safety of all soldiers. Strict adherence to the PT schedule in Section 7 will ensure that all of the principles of exercise are appropriately employed and that the degree of challenge is increased in logical increments throughout the training cycle. The standards for performance of all exercises must be strictly applied. The duration and intensity of PT sessions may need to be adjusted to compensate for other physically demanding activities.

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APPENDIX A

PT Leader Drill Cards

The PT Leader Drill Cards are intended for use as a reference when leading the PT drills in Army Physical Training Standardization. The drills must be performed in the order listed to the standards prescribed or they lose much of their value.

The drill cards are sized to 3" x 5". Cut around the outside of the figure below; fold in the middle so that the two sides are back-to-back, and laminate.

WARM-UP
Conditioning Drill 1 (1 set x 5 reps)
1. The Bend And Reach (4-count, SLOW)
2. The Rear Lunge (4-count, SLOW)
3. The High Jumper (4-count, MODERATE)
4. The Rower (4-count, SLOW)
5. The Squat Bender (4-count, SLOW)
6. The Windmill (4-count, SLOW)
7. The Forward Lunge (4-count, SLOW)
8. The Prone Row (4-count, SLOW)
9. The Bent-leg Body Twist (4-count, SLOW)
10. The Push-up (4-count, MODERATE)
The Military Movement Drill (1 set x 1 rep)
1. Verticals
2. Laterals
3. The Shuttle Sprint

COOL-DOWN
Conditioning Drill 1 (1 set x 5 reps)
1. The Bend And Reach (4-count, SLOW)
2. The Rear Lunge (4-count, SLOW)
3. The High Jumper (4-count, MODERATE)
4. The Rower (4-count, SLOW)
5. The Squat Bender (4-count, SLOW)
6. The Windmill (4-count, SLOW)
7. The Forward Lunge (4-count, SLOW)
8. The Prone Row (4-count, SLOW)
9. The Bent-leg Body Twist (4-count, SLOW)
10. The Push-up (4-count, MODERATE)
The Stretch Drill (1 set x 1 rep)
1. The Overhead Arm Pull (20 seconds)
2. The Rear Lunge (20 seconds)
3. The Flex and Extend (20 seconds)
4. The Thigh Stretch (20 seconds)
5. The Single-leg Over (20 seconds)

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Conditioning Drill 1 (1 set x 10 reps)
1. The Bend And Reach (4-count, SLOW)
2. The Rear Lunge (4-count, SLOW)
3. The High Jumper (4-count, MODERATE)
4. The Rower (4-count, SLOW)
5. The Squat Bender (4-count, SLOW)
6. The Windmill (4-count, SLOW)
7. The Forward Lunge (4-count, SLOW)
8. The Prone Row (4-count, SLOW)
9. The Bent-leg Body Twist (4-count, SLOW)
10. The Push-up (4-count, MODERATE)
Conditioning Drill 2 (10-20/5 reps)
1. The Push-up (4-count, MODERATE)
2. The Sit-up (4-count, MODERATE)
3. The Straight-arm Pull (2-ct., MODERATE)
4. The Pull-up (2-count, MODERATE)
5. The Knee Raise (2-count, MODERATE)

Conditioning Drill 3 (1-2 sets x 5-10 reps)
1. The Power Jump (4-count, MOD)
2. The V-up (4-count, MOD)
3. The Mountain Climber (4-count, MOD)
4. The Leg Tuck and Twist (4-count, MOD)
5. The Single-leg Push-up (4-count, MOD)
Military Movement Drill 2 (1-2 sets)
1. The Lunge Walk
2. The Saddle-back Carry
3. The Fireman's Carry

BCT Ability Group Progression (4 Groups)

Group	WK 1	WK 2	WK 3	WK 4
A	15 min @7:30	15 min @7:15	20 min @7:15	20 min @ 7:15
B	15 min @ 9:00	15 min @ 8:30	20 min @ 8:30	20 min @ 8:30
C	10 min @10:30	12 min @ 10:00	14 min @ 10:00	16 min @ 9:30
D	10 min @ 12:00	12 min @ 11:00	14 min @ 10:30	16 min @ 10:00

Soldiers running the one-mile in **7:15 and faster** will be assigned to ability group **A.**
Soldiers running the one-mile from **7:16 to 8:45** will be assigned to ability group **B.**
Soldiers running the one-mile from **8:46 to 10:15** will be assigned to ability group **C.**
Soldiers running the one-mile in **10:16 and slower** will be assigned to ability group **D.**

BCT Ability Group Progression (4 Groups)

Group	WK 5	WK 6	WK 7	WK 8/9
A	20 min @ 7:00	25 min @ 7:00	25 min @ 7:00	30 min @ 7:00
B	20 min @ 8:00	25 min @ 8:00	25 min @ 7:30	30 min @ 7:30
C	18 min @ 9:00	20 min @ 8:30	20 min @ 8:00	20 min @ 8:00
D	18 min @ 9:30	20 min @ 9:30	20 min @ 9:30	20 min @ 9:00

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AIT Ability Group Running (4 Groups)

Group	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7
A	No AGR	20 min @ 6:45	20 min @ 6:45	20 min @ 6:45	25 min @ 6:45	25 min @ 6:45	25 min @ 6:45
B	No AGR	20 min @ 7:45	20 min @ 7:45	20 min @ 7:45	25 min @ 7:45	25 min @ 7:45	25 min @ 7:45
C	No AGR	20 min @ 8:45	20 min @ 8:45	20 min @ 8:45	25 min @ 8:45	25 min @ 8:45	25 min @ 8:45
D	No AGR	20 min @ 9:00	20 min @ 9:00	20 min @ 9:00	25 min @ 9:00	25 min @ 9:00	25 min @ 9:00

Soldiers running the one-mile in 6:30 and faster will be assigned to ability group A.
Soldiers running the one-mile from 6:31 to 7:30 will be assigned to ability group B.
Soldiers running the one-mile from 7:31 to 8:30 will be assigned to ability group C.
Soldiers running the one-mile in 8:31 and slower will be assigned to ability group D.

AIT Ability Group Running (4 Groups)

Group	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14
A	25 min @ 6:30	25 min @ 6:30	25 min @ 6:30	30 min @ 6:30	30 min @ 6:30	30 min @ 6:30	30 min @ 6:30
B	25 min @ 7:30	25 min @ 7:30	25 min @ 7:30	30 min @ 7:30	30 min @ 7:30	30 min @ 7:30	30 min @ 7:30
C	25 min @ 8:30	25 min @ 8:30	25 min @ 8:30	30 min @ 8:30	30 min @ 8:30	30 min @ 8:30	30 min @ 8:30
D	25 min @ 8:45	25 min @ 8:45	25 min @ 8:45	30 min @ 8:45	30 min @ 8:45	30 min @ 8:45	30 min @ 8:45

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BCT Speed Running Progression

Group	WK 1	WK 2	WK 3	WK 4
A	6 reps 30:60	8 reps 30:60	10 reps 30:60	6 reps 60:120
B	6 reps 30:60	8 reps 30:60	10 reps 30:60	6 reps 60:120
C	4 reps 30:60	6 reps 30:60	8 reps 30:60	4 reps 60:120
D	4 reps 30:60	6 reps 30:60	8 reps 30:60	4 reps 60:120

All ability groups should run at a slow pace (jog) ¼ mile prior to beginning 30:60s or 60:120s.
All ability groups should walk a minimum of 2-3 minutes prior to performing additional activities or Cool-down.

BCT Speed Running Progression

Group	WK 5	WK 6	WK 7	WK 8/9
A	8 reps 60:120	10 reps 60:120	10 reps 60:120	10 reps 60:120
B	8 reps 60:120	10 reps 60:120	10 reps 60:120	10 reps 60:120
C	6 reps 60:120	8 reps 60:120	8 reps 60:120	8 reps 60:120
D	6 reps 60:120	8 reps 60:120	8 reps 60:120	8 reps 60:120

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AIT Speed Running Progression

Group	WK 1	WK 2	WK 3	WK 4	WK 5	WK 6	WK 7
A	30:60 6 reps	30:60 8 reps	30:60 8 reps	30:60 10 reps	30:60 10 reps	60:120 6 reps	60:120 6 reps
B	30:60 6 reps	30:60 8 reps	30:60 8 reps	30:60 10 reps	30:60 10 reps	60:120 6 reps	60:120 6 reps
C	30:60 4 reps	30:60 6 reps	30:60 6 reps	30:60 8 reps	30:60 8 reps	60:120 4 reps	60:120 4 reps
D	30:60 4 reps	30:60 6 reps	30:60 6 reps	30:60 8 reps	30:60 8 reps	60:120 4 reps	60:120 4 reps

All ability groups should run at a slow pace (jog) ¼ mile prior to beginning 30:60s or 60:120s.
All ability groups should walk a minimum of 3 minutes prior to performing additional activities or Cool-down.

AIT Speed Running Progression

Group	WK 8	WK 9	WK 10	WK 11	WK 12	WK 13	WK 14
A	60:120 8 reps	60:120 8 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps
B	60:120 8 reps	60:120 8 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps	60:120 10 reps
C	60:120 6 reps	60:120 6 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps
D	60:120 6 reps	60:120 6 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps	60:120 8 reps

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APPENDIX B

Climbing Bars

Figure B-1.

Climbing Bars Specifications

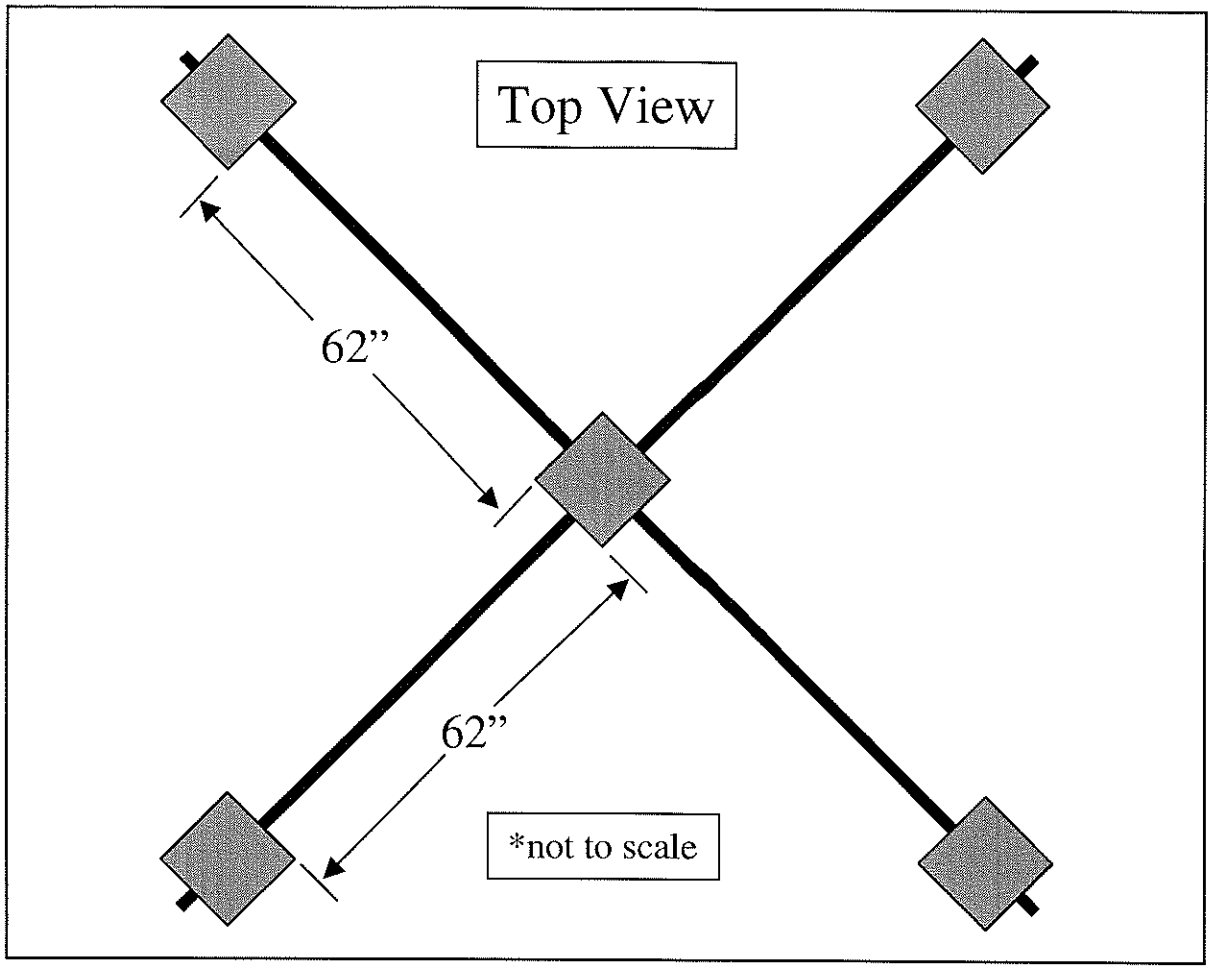

Figure B-2.

The specifications for the climbing bars are as follows:

- The posts (5) are 6" x 6" x 12' and sunk 3 feet into the ground.
- The bars (2) are threaded water pipe, 1.5 inch outside diameter, 12 feet long with 1-inch end caps (4).
- The bars are throught the 6x6s at 7.5 and 8 feet above the ground.
- The distance from inside post edge to inside post edge is approximately 62 inches (refer to Figure B-2). This is to allow enough bar space to conduct all exercises safely.
- The step-ups (16 inches long) are cut from 4" x 4" x 8' posts and secured to the 6x6s with 3 inch screws that are counter sunk.
- The step-ups on the outside 6x6 posts are 18 inches from the ground, the step-ups on the inside post are 24 inches above the ground (refer to Figure DB-3).

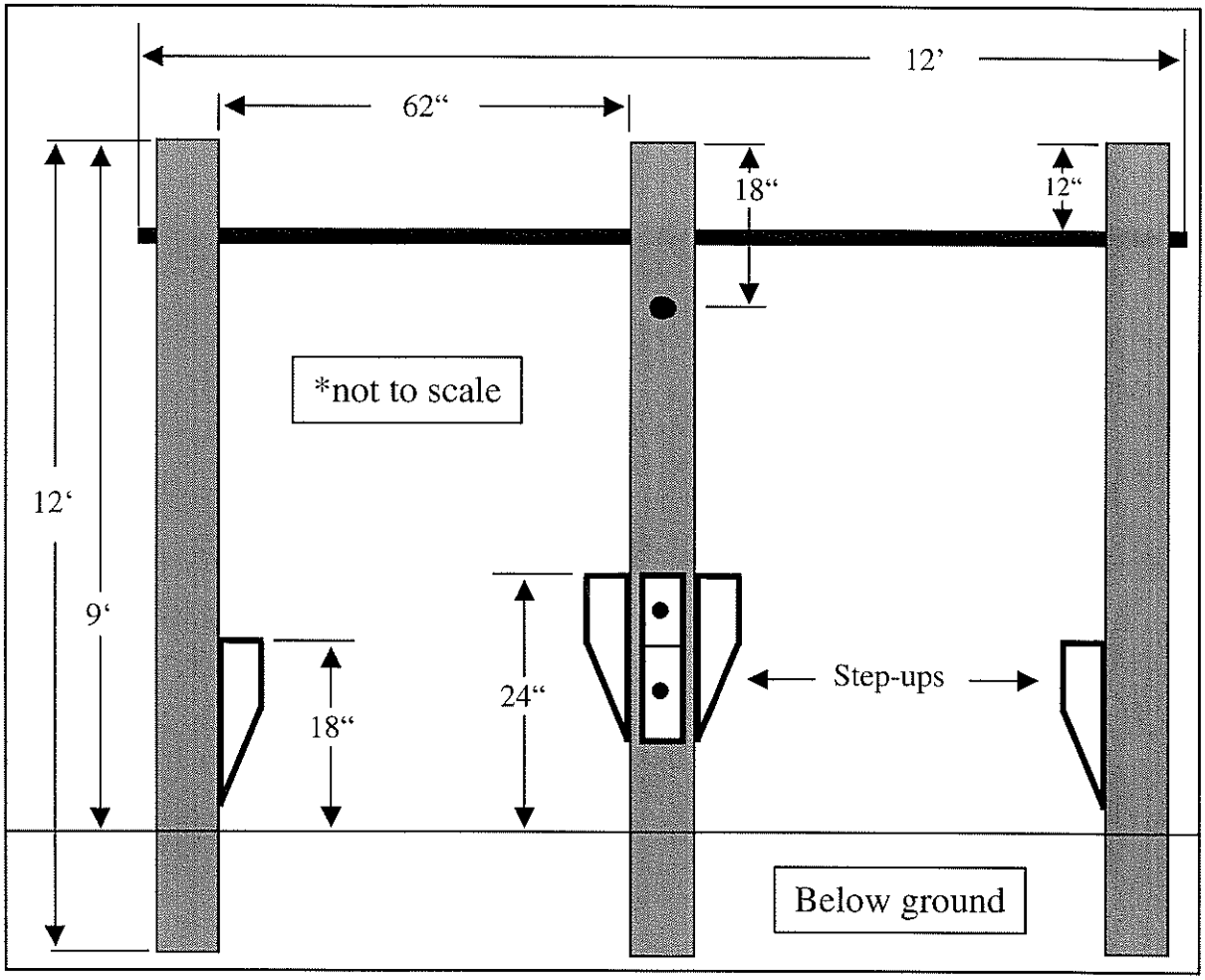

Figure B-3.

The following planning considerations apply:

- Climbing bars provide adequate space and facilitate better command and control than traditional pull-up bars. Traditional pull-up bars are too narrow to safely and efficiently conduct the climbing drills.
- Employment of multiple climbing bar "pods" as shown in Figure B-4 will allow for efficient mass training. The climbing drills require one bar for every three soldiers when performed as a single activity.
- The total ground surface area for four pods is only 625 square feet.
- Four pods will accommodate 16 stations x 3 soldiers per station for a total of 48 soldiers.
- Additional free-standing pods should be constructed to accommodate more soldiers.

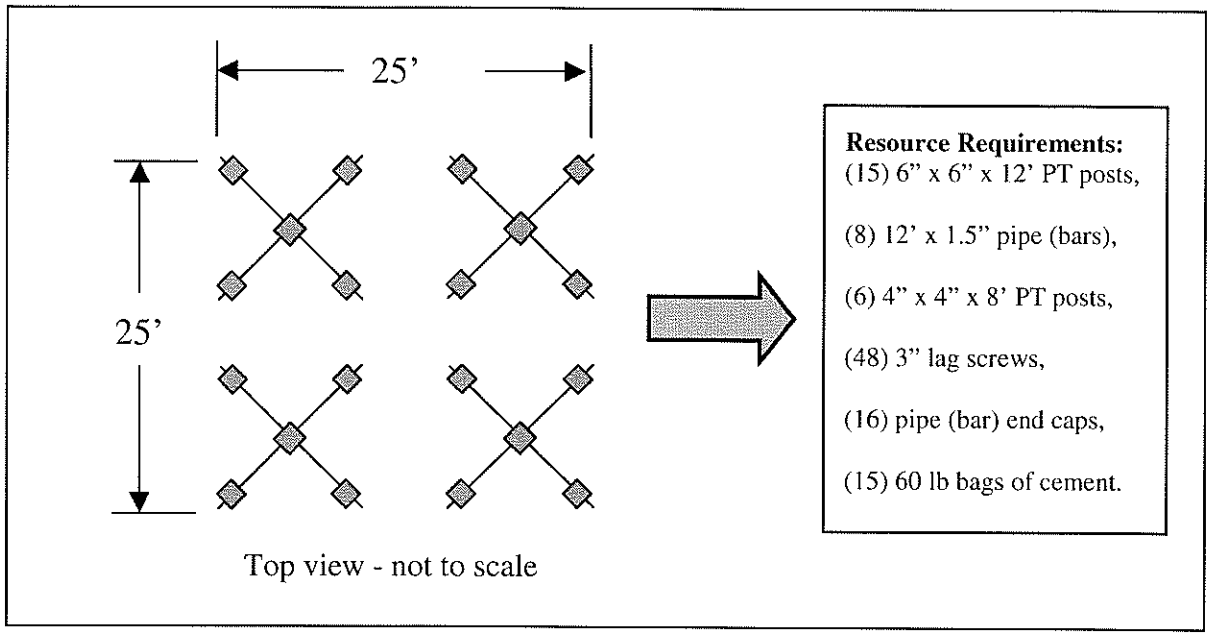
25'
25'
Top view - not to scale
Resource Requirements:
(15) 6" x 6" x 12' PT posts,
(8) 12' x 1.5" pipe (bars),
(6) 4" x 4" x 8' PT posts,
(48) 3" lag screws,
(16) pipe (bar) end caps,
(15) 60 lb bags of cement.

FIGURE B-4.

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